UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
AIR QUALITY

Hot Mix Asphalt Cost of Controls Overview
Proposed Rule: R307-313

Identifying Sources

All Hot Mix Asphalt (HMA) facilities are required to report to the State and Local Emissions Inventory System (SLEIS), since they operate equipment that falls under New Source Performance Standards (NSPS) I (for HMA plants). Sources were selected from the SLEIS system by North American Industry Classification System (NAICS) code or by relevant Source Classification Code (SCC).

Sources were identified from the following five NAICs codes:

- 212319 (Other Crushed and Broken Stone Mining and Quarrying),
- 212321 (Construction Sand and Gravel Mining),
- 237310 (Highway, Street, and Bridge Construction),
- 324121 (Asphalt Paving Mixture and Block Manufacturing), and
- 333120 (Construction Machinery Manufacturing).

Sources were identified from the following seven SCCs:

- 30500205 (Drum Dryer: Drum Mix Plant),
- 30500245 (Batch Mix Plant: Hot Elevators, Screens, Bins, Mixer & NG Rot Dryer),
- 30500255 (Drum Mix Plant: Rotary Drum Dryer/Mixer, Natural Gas-Fired),
- 30500257 (Drum Mix Plant: Rotary Drum Dryer/Mixer, Natural Gas, Counterflow),
- 30500212 (Heated Asphalt Storage Tanks),
- 40301022 (Asphalt Oil: Breathing Loss), and
- 40301099 (Other Product: Working Loss).

After potential sources were identified, permits were checked to verify that the relevant equipment was permitted at the site.

Emission Calculation Methodology

To estimate the impact of blue smoke controls at HMA plants, site-specific data was used wherever it was available. Where site-specific data was not available, a VOC emission factor of 0.032 lbs per ton of HMA[1] was used to estimate 2017 and 2020 emissions in most cases.

To estimate Potential To Emit (PTE) totals, permit applications were reviewed for equipment-specific numbers. If permit applications were not available in an electronic form, the following formulas were used:

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[1]AP-42 Chapter 11.1 Hot Mix Asphalt Plants.

- Facility HMA production maximum in published permits multiplied by VOC emission factor and divided by 2,000 to estimate PTE tonnage.
- If HMA production maximum was unavailable, the average VOC tonnage at other sites (per HMA plant) was used, multiplied by the number of HMA plants on-site.

No AP-42 emission factor exists for asphalt tanks, as tank emissions are calculated based on specific inputs, such as temperature, fuel type, tank height and diameter, and others. As a result, 2017 and 2020 emissions were based on estimates derived from SLEIS. For PTE calculations, permit applications were reviewed for equipment-specific numbers. If permit applications were not available, an average of other sites was calculated (for one tank), and multiplied by the number of tanks at a given site.

Available permit applications were reviewed for equipment quantities, then cross-checked against current permits and SLEIS data to produce the most accurate and up-to-date number for pieces of equipment.

To project emissions for the attainment year of 2023, REMI projection factors were used in accordance with the steps used for the current 2015 Moderate Ozone State Implementation Plan. All facilities had detailed 2020 reports, thus 2020 was set as the default base year. Projections were carried out normally for projection year 2023 without controls, but percentages of emissions were removed from projection year 2023 with controls on HMA plants and asphalt tanks. UDAQ assumed a 90% control rate for asphalt tanks and 70% for HMA plants based on conversions with control manufacturers and internal review of available emission reduction testing results.

Cost of Controls

For blue smoke controls, estimated initial costs are as follows:

- Blue smoke control system: $215,000.
- Fan controls: $13,975
- Inlet headers: $10,200
- Two air-actuated butterfly dampers: $4,800
- Strip curtain enclosures: $2,825
- Silo and tunnel ducting: $44,500
- Installation: $48,375
- **Total Initial Costs: $339,675**

Estimated Annual Costs:

- Five replacement stage 4 filters: $100/yr
- 20 replacement filters for stages 5-7: $15,000/yr
- **Total Annual Costs: $15,100/yr**

An expected lifetime of 35 years for this control was assumed. The total initial cost of $339,675 spread across a life expectancy of 35 years equals $9,705 per year. When added to the estimated annual cost of $15,100, the estimated annualized cost of controls is **$24,805**.

For tank controls, the estimated initial costs are as follows:

- Carbon absorption collector: $108,560
- Blower controls: $4,150
- Ducting: $28,690
- Installation: $30,000
- **Total Initial Costs: $171,400**

Estimated Annual Costs:

- Stage 2 filter $700
- Five stage 3 filters $100/yr
- Stage 4 carbon filter $1,600
- Stage 5 carbon bed $1,600
- **Total Annual Costs: $4,000**

The total initial cost of $171,400, divided by an expected lifetime of 35 years and added to estimated annual maintenance costs produces an annualized cost of **$8,897.14**.

Final Estimates

Based on the PTE estimates and annualized cost of controls, DAQ estimates that:

- Blue smoke controls could prevent 52.08 tons of VOC from entering the atmosphere from 12 HMA units in the nonattainment area at an annualized cost per ton of **$5,714.95**.
- Tank controls could prevent a maximum of 102.66 tons of VOC from 145 tanks at 13 facilities in the nonattainment area at a cost per ton of VOC at **$2,094.38** (one control device can operate up to 6 tanks).